It is, what South Kensington is not, an easily accessible place, and yet is not too noisy for the purpose, and it will have the additional advantage of the near presence of our greatest library and museum. It is safe to say that there is at present no site in London comparable with it, and none so suitable is likely to be available for many years.

The only objection possessing any validity to the acceptance of the Government's offer is the financial one. This is, we admit, a serious question, and it would be foolish to minimise its importance. Hitherto both the University headquarters and King's College have been housed free by the Government. This arrangement will now come to an end, and it is obvious that the cost of covering the site with buildings that shall be worthy of London's University will be considerable. Mr. Fisher feels that in this the University can look with confidence to the generosity and public spirit which have always marked the citizens of London. We think he is right. We are convinced that, if proper efforts are made, enough and more than enough money will be forthcoming for the purpose. The results of the present Vice-Chancellor's appeal to the City in connection with the degrees of commerce of the University afford an index of the support that would be forthcoming from the City Companies and the great commercial houses if the sympathies and the co-operation of the commercial community were enlisted in the greater cause of the University as a whole. Private benefactors would be attracted to a bold and well-conceived plan of creating a great university quarter, and Londoners, if there were some outward and visible sign of the greatness of their University, would not be found wanting either in the civic pride or in the willingness to pay which is found in the provinces or in Continental cities.

We hope the University authorities will take their courage in both hands and go forward boldly. The reasons which forbid the Government from giving further assistance in these days may be regrettable, but they are easily intelligible. We are sure that if the University rises to the occasion neither this nor any future Government will be allowed to leave it to struggle unaided. We are equally sure that if counsels of timidity are allowed to prevail and this opportunity is lost the University will have forfeited irrevocably any claim on the public or the Government for support in the future.

Manuals on Applied Chemistry.

(1) *Practical Leather Chemistry: A Handbook of Laboratory Notes and Methods for the Use of Students and Works Chemists.* By Arthur Harvey. Pp. viii+207. (London: Crosby Lockwood and Son, 1920.) Price 15*s.* net.

(2) *Chemistry for Textile Students: A Manual Suitable for Technical Students in the Textile and Dyeing Industries.* By Barker North, assisted by Norman Bland. (Cambridge Technical Series.) Pp. viii+379. (Cambridge: At the University Press, 1920.) Price 30*s.* net.

(3) *The Chemistry of Coal.* By John Braithwaite Robertson. (Chemical Monographs.) Pp. viii+96. (London: Gurney and Jackson, 1919.) Price 3*s.* 6*d.* net.

(1) MR. HARVEY'S handbook is intended for the use of the works chemist in charge of the analytical and testing department of a tannery. It is an eminently practical work, well and clearly written with due regard to modern methods, and evidently based upon considerable personal experience. It presupposes that the user of the book has had not only a preliminary course of instruction in theoretical chemistry, but also the opportunity of a laboratory training in manipulation in qualitative and quantitative analysis. In these circumstances the book can be thoroughly recommended as an excellent *vade mecum* to the work of the chemical laboratory of a tannery, or to the student who intends ultimately to specialise on leather chemistry. It will be found to cover practically every problem that the works chemist of a tannery may have to face. The analytical methods described have been thoroughly tested, and are well adapted to practical conditions.

(2) The manual by Mr. Barker North and Mr. Norman Bland is a work of a very different class. It is essentially a text-book of the elementary chemistry of certain of the non-metallic elements and their compounds, together with a somewhat bald account of the chemistry of a few carbon derivatives. The section devoted to technical chemistry as applied to the textile industries occupies only some twenty-eight of the 379 pages of which the book consists. The authors are lecturers in chemistry to the evening classes of the Technical Colleges of Bradford and Huddersfield respectively, both important centres of the textile and dyeing industries, and their object, no doubt, is to attract students who are, or may be, engaged in these industries. In their preface they point out that whilst the cotton and woollen industries occupy most important positions

among the nine leading industries of the country, it is only within recent years that even enlightened employers have begun to realise that "chemistry and physics play a most important part in the various operations used in the production of yarns and finished pieces."

All this may be very true. But it is equally true that the hard-headed Yorkshire manufacturer who turns over the pages of this well-printed and handsomely illustrated book will be slow to perceive wherein it bears directly upon his industry. He will be apt to think that the kinetic theory and Avogadro s hypothesis have as little to do with woollens and worsteds as the binomial theorem has with the common pump. There is not the slightest intention to minimise the importance of a knowledge of the principles upon which chemistry as a science is based, or to depreciate its value when applied to industry. It is admitted, of course, that no technologist is adequately trained who is wholly ignorant of the science. But in compiling a text-book which would seem to be mainly directed to the work of their classes the authors have attempted too much. They have mixed up purely elementary doctrinal chemistry with applications involving a very different kind of knowledge. The problems of textile chemistry are far more recondite than their association with rudimentary chemistry, as in this book, would seem to imply. We have no fault to find with the book as a text-book to accompany an experimental course of evening lectures such as the authors are engaged in giving, except that its price will probably be beyond the means of the ordinary evening-class student.

The course as set out in the book is well arranged, and it is intended that the pupils shall themselves perform many of the elementary experiments described, presumably in a laboratory class. There is no doubt that if they work through the list under competent direction they will acquire a considerable amount of information, and gain some proficiency in chemical manipulation. No special experiments are described in the section devoted to the systematic study of the non-metals and their important compounds, or in that concerned with the chemistry of the hydro-carbons and their derivatives, but the student is directed to "pick out the portions which are suitable for experimental illustration with the apparatus at his command"—a direction which, it may be hoped, will strengthen any latent power of original investigation that he may possess.

The scope of the teaching has presumably been limited to what has been found to be practicable in such courses of evening-class instruction as are possible in the institutions with which the authors are connected, and there can be no doubt that if the beginner faithfully follows the teaching and supplements it by reading the "larger and more specialised works" to which he is referred, and which, it is to be hoped, he will find in the libraries of the schools to which he may be attached, he will have acquired a very fair acquaintance with the elements of chemistry. But as he pursues his reading, and enters upon the perusal of the more specialised works on the chemistry of textiles, he will realise that he has got no further than the alphabet of the subject. After all, a knowledge of the alphabet is an essential step, and it may be that the authors, *pace* the title of their book, have aimed no higher. The time will come when our technical schools will not mix up elementary with applied teaching, but make each section independent. Applied chemistry must of course be based on elementary and theoretical chemistry, but there are no short cuts to proficiency in any one branch, and it is a bad system of instruction which fosters the idea that there can be.

(3) In about ninety small octavo pages Mr. J. B. Robertson, lecturer in chemistry at the South African School of Mines and Technology, Johannesburg, has sought to give an account of the chemistry of coal. His title may be held to imply more than his little monograph actually covers, as he confines himself to a very limited portion of what in reality is a very wide field, and has very little to say respecting the chemical derivatives of coal, except to the extent that they may be supposed to throw light on the nature of the proximate constituents of coal. In five short chapters, or sections, Mr. Robertson discusses the mode of occurrence of coal, its origin, and the various methods of classifying it; the action of solvents, *e.g.* benzene and pyridine, etc., upon the coal substance; its oxidation and destructive distillation. The summaries are exceedingly short, but they are accurate and fairly up-to-date, and at least serve to show how much remains to be done before the real chemical nature of coal is elucidated. Practically all that we know at present is that coal consists of a variable and indefinite mixture of at least two constituents, one of which appears to be a degradation product of cellulose, and the other a resinoid substance which can be extracted by appropriate solvents; and that it is upon the relative proportion of these constituents that the technical value and industrial applications of coal largely depend. But the precise nature of these constituents is as yet very imperfectly defined, and the suggestions that have been made as to their origin are little more than surmises.

The most detailed sections of the book relate to the analysis of coal, proximate and ultimate; these, compared with the preceding sections, are remarkably full and evidently based upon personal experience. It would have added to the comprehensiveness of the account if a description of the methods of determining arsenic had been given. Owing to legislation arising out of the arsenic-in-beer scare the value of coal, especially anthracite, for kilning purposes is greatly affected by the presence of even small quantities of arsenic. The method of determining the calorific value of coal would have been rendered more intelligible if the description had been accompanied by an illustration of the calorimeter. Lastly, we deprecate the practice of placing the bibliographical references in the text at the end of the book. This method, at least as regards chemical literature, seems to have originated in Germany. We fail to perceive that it has a single redeeming feature. On the contrary, it produces the maximum amount of inconvenience. It involves constant turning backwards and forwards, which is apt to become tiresome and to lead to error. It is far preferable to embody the references in the text, or at least to place them as foot-notes to the pages on which they occur.

A Standard Book on Soils.

The Soil: An Introduction to the Scientific Study of the Growth of Crops. By Sir A. D. Hall. Third edition, revised and enlarged. Pp. xv + 352. (London: John Murray, 1920.) Price 7*s.* 6*d.* net.

IT is pleasant to see that Sir Daniel Hall's book on the soil has now reached a third edition. It will have a permanent place in British agricultural literature as the first book on the subject in the modern period. Its distinguishing feature, which marked it off from its predecessors, is its clear recognition of the complexity of the soil problem, emphasised in the opening words and maintained throughout: "In the scientific study of soils, chemical, physical, and biological considerations are involved." Successive generations of earlier workers had regarded soil fertility as essentially chemical, physical, or bacteriological. This book was the first to show British readers that all these different views had a basis of truth, but that each by itself was too narrow. The study of the soil, in short, cuts across the conventional divisions of science and brings together such apparently diverse workers as the physicist and the protozoologist, the mathematician and the plant physiologist, and others who in an ordinary scientific laboratory would be supposed to have nothing in common.

To write an adequate review of the book, comparing it with the preceding editions, would be to write a history of the development of modern soil science, and could not be done in a short notice. The leading advances have been in our knowledge of the constitution of the soil and of the population inhabiting it. In both directions recent investigations have revealed greater complexity and emphasised still further the need for "team" work to supplement the indispensable, but limited, individual work.

Ten years ago there was only one soil biologist at Rothamsted; now there are nine, and others, it is hoped, will soon be added. Bacteria were at first supposed to be the only organisms concerned; now it is realised that fungi, actinomycetes, algæ, and protozoa are all present in the soil, and probably all concerned in some way in the great changes going on.

Sir Daniel stimulates a living interest in the subject and makes constant reference to the experience of farmers, gardeners, and others in soil management and in the behaviour of plants in different soil conditions. These serve to show the student how much remains to be done in spite of all the advances of recent years; in this way also the book acts as a valuable corrective to the tendency showing itself in certain modern textbooks of regarding the soil as a physico-chemical system the properties of which are expressible in mathematical terms. These analytical methods have their uses, but they would become dangerous if they were allowed to obscure the complexity of the problem.

There is a valuable section on soil types containing much information of interest to the ecologist as well as to the agriculturist. The section on land reclamation is of particular interest at the present time and has a breadth of view and a freedom from extravagent anticipations rarely found in discussing this important subject. Altogether the book keeps up its reputation and will prove invaluable to the serious student of the subject.

E. J. R.

Savages of the Far Past.

An Introduction to Anthropology: A General Survey of the Early History of the Human Race. By the Rev. E. O. James. Pp. ix + 259. (London: Macmillan and Co., Ltd., 1919.) Price 7*s.* 6*d.* net.

MR. JAMES aims at introducing the student not so much to anthropology in general as to prehistoric archæology interpreted in the light of the study of primitive man, modern as well as ancient. After an introductory chapter outlining